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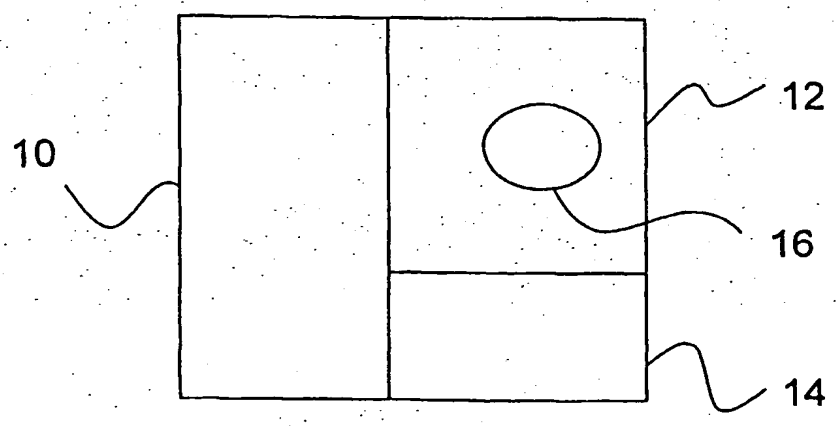
(54) Title: INFORMATION RETRIEVAL SYSTEM AND METHOD EMPLOYING SPATIALLY SELECTIVE FEATURES



(57) Abstract: An information retrieval system and method employing spatially selective features. The system includes a search interface, a map interface, a results table interface, and a Lasoo tool for selecting a search area. The method includes the steps of providing a search interface, providing a map interface, providing a results table interface, and providing a Lasoo tool for selecting a search area.

WO 02/065331 A2

Information Retrieval System And Method Employing Spatially Selective Features

Field of the Invention

The present invention relates generally to information retrieval systems, and more particularly to an information retrieval system and method employing spatially selective features.

Background of the Invention

Although location is a fundamental, unifying principle humans use to organize their "spatial awareness" of the world, the Internet has failed to deliver high performance spatial search and retrieval capabilities.

Traditional means of finding local content have included reading the local newspapers, searching telephone yellow page directories, listening to the radio, spotting billboards, and seeing local TV announcements or advertising. On the Internet today, some local content can be found using 'yellow page' listing services, city content sites, local portals and ISPs.

However, these services offer limited geographic scope and focus mainly on large metropolitan areas. While all of these content sites provide elements of useful information, what is needed is a method to provide a continuum of data across the entire world, and across all categories. As well, it would be advantageous to enable average users to add local content to these databases.

Quickly and easily finding local content on the Internet today is a laborious, convoluted, and inconsistent experience. Internet users are

typically required to provide specific Zip code, or other positional information to conduct a search for local content.

Furthermore, in order to find any specific local content, the user has been required to enter a known geographic, postal, or street address to commence a search. This inhibits a user in performing 'real-world' searches where one might not know an address or postal code. A system for finding local content at any point within an international geographic extent has not been possible.

Current Internet mapping and local search capabilities are limited to static data, and are restricted to a delimited geographic area, such as a country, and do not provide an optimal geo-location search range for each record. Typically, searches on the Internet are performed by selecting a pre-determined classification of information by sub-category(s). The problem is that the resulting size of the search catalogues often requires time-consuming scanning by users through a myriad of categories and/or a large amount of irrelevant results.

Geographic Information Systems (GIS) have, for many years, provided tools to generate, manipulate, and manage spatial data. Government agencies and commercial data vendors use GIS extensively to create and maintain map data used by location services. Vendors provide street-centerline data sets that include address and street name data, which are essential to geo-coding and routing applications. Location services that incorporate GIS tools enable a wide range of spatial transactions that can be delivered in meaningful ways.

Some commercially available database management systems (DBMS) currently include basic spatial data management capabilities, providing limited support to location services. DBMS's specialize in the storage and

management of all types of data including geographic data, and are optimized to store and retrieve data. Although many GIS's rely on DBMS's for this purpose, they are not competitive in terms of performance, flexibility, and scalability without direct access to a robust GIS at their foundation.

Distributing geographic information via the Internet enables real-time display and integration of data from around the world. A natural extension of a traditional desktop GIS, Internet mapping and associated applications have been popularized by various sites that deliver maps to the end user via a browser. However to date, mapping on the Internet has been mainly a cartographic exercise, with minimal capability for true information searching and adding of new content.

Computer desktop mapping systems use the map paradigm to organize data and user interaction. The focus of such systems is the creation of maps, with the map linked to a database containing related information. However, most desktop mapping systems have limited data management, spatial analysis, or customization capabilities.

Computer Aided Design (CAD) systems have evolved to create designs, and buildings plans. CAD systems require that components with fixed characteristics be assembled to create the whole structure. These systems feature few rules to specify how components can, or should be, assembled and include very limited analytical capabilities. Although some CAD systems have been extended to support maps, they typically have limited utility for managing and analyzing large geographic databases.

Remote sensing is the art and science of making measurements of the earth using sensors such as GPS receivers, or cameras fitted to aircraft or satellites. These sensors collect data in the form of images and data streams

and include specialized capabilities for manipulating, analyzing, and visualizing those images.

For the foregoing reasons, there is a need for an improved information retrieval system and method.

Summary of the Invention

The present invention is directed to an information retrieval system and method employing spatially selective features. The system includes a search interface, a map interface, a results table interface, and a Lasoo tool for selecting a search area. The method includes the steps of providing a search interface, providing a map interface, providing a results table interface, and providing a Lasoo tool for selecting a search area.

In an aspect of the present invention, roll-out map controls are provided to optimize the use of limited display space; view finder control to provide a panning function to the map; and custom spatial driving directions to display a list of routes on the map. In an aspect of the present invention, a geo-enabled messaging and conference module is provided to apply spatial characteristics to each member of a conference or messaging service, and to enable the members to selectively communicate with other members.

The invention removes the barriers to finding local content quickly and easily. The invention solves the problem of requiring specific postal code or other positional information in order to conduct a search for local content by providing simple 'point and click' entry to begin a search anywhere in the World. The invention provides scalability and reliability, delivering comprehensive, targeted and customizable geo-coded local content, based on a user's actual or preferred location anywhere in the World, to any wired or wireless Internet device.

Other aspects and features of the present invention will become apparent to those ordinarily skilled in the art upon review of the following description of specific embodiments of the invention in conjunction with the accompanying figures.

Brief Description of the Drawings

These and other features, aspects, and advantages of the present invention will become better understood with regard to the following description, appended claims, and accompanying drawings where:

Figure 1 is an overview of an information retrieval system employing spatially selective features according to an embodiment of the present invention;

Figure 2 is an overview of an information retrieval method employing spatially selective features according to an embodiment of the present invention;

Figure 3 illustrates a user interface according to an embodiment of the present invention;

Figure 4 illustrates an example of a Micro-Map;

Figure 5 illustrates the wireless use of the application;

Figure 6 is a simplified overview of logical architecture according to an embodiment of the present invention; and

Figure 7 is an overview of the system according to an embodiment of the present invention.

Detailed Description of the Presently Preferred Embodiment

The present invention is directed to an information retrieval system and method employing spatially selective features. As illustrated in Figure 1, the system includes a search interface 10, a map interface 12, a results table

interface 14, and a Lasoo tool 16 for selecting a search area. As illustrated in Figure 2, the method includes the steps of providing a search interface 100, providing a map interface 102, providing a results table interface 102, and providing a Lasoo tool 104 for selecting a search area.

Search Interface

A Polygon Search Module (PSM) that enables the definition and storage of any geo-spatial polygon, comprising an unlimited number of 'sides' to the polygon, defined by the applicable latitude and longitude co-ordinates of each 'side'. The PSM can be used to define a search area for any point located within the boundary of the polygon.

The PSM includes an Automatic Clipping Engine (ACE) that produces a radial search area, based on the current search position and search range, within which the polygon is a geo-spatial sub-set, then automatically removes or 'clips' any results that lie outside of the polygon, whenever a search based on the defined PSM is made, subject to extension of the searchable area using a Dynamic Search Range Module (DSRM), as described below. The PSM extends the search algorithm of the standard radial search to any geo-spatial polygon, such as any area, region, state, or country.

The invention includes an ability to create maps based on a given longitude/latitude or a city, Zip code, state, or country. Search results are provided in tabular format with a linked map, along with a platform to allow users to add information to a geo-referenced database. All information within the application's database should be tied to a precise longitude and latitude and can be displayed on a variety of scaled, electronic maps over the Internet.

A Dynamic Categories Module (DCM) creates a dynamic set of categories to present to the user dependent on the current map setting. The

DCM automatically identifies any non-populated categories for the current map setting. In addition, the DCM performs a spatial count of records within each qualifying category that are encompassed by the current map setting. Thus the user is presented with a qualified list of Categories relative to the specific map setting and each qualified category in the tree structure is displayed along with the number of valid records contained within that Category, where the number shown is inclusive of any 'child' category records.

The DCM provides the principle advantage that the end-user is presented with a manageable, relevant set of categories, as opposed to a much larger, less relevant list, for the map setting that the user has currently selected; thus, making searching much quicker and more effective. Whenever the user selects a new location to begin a search, the DSRM geo-spatially evaluates all data surrounding the specified location, and automatically determines an appropriate default search range to provide search results for this location and range, in all appropriate categories.

In addition, the DSRM is utilized whenever a keyword search is invoked. The DSRM ensures that relevant results are returned, provided relevant data exists at some location geo-spatially. The DSRM ensures the location of the closest set of search results to the user's specified location, no matter what location and range was initially specified by the user for the search.

An Internet Database Link Control Module (IDLCM) takes database content from any DBMS and automatically enables access via the Internet to the information contained in that database, through auto re-direction of search requests emanating from any Internet search engine. The IDLCM automatically directs search requests for any directory listing or category to a local search results page for the desired location and category/reference by

means of an IDLCM result link displayed to the user within the search engine's result list. The IDLCM produces this functionality by automatically creating a specific Web page with imbedded mega-tags and other information for each record in the set of records that the database manager wishes to make Internet accessible.

The software automatically directs search requests from any Internet search engine for any search related to the key or index value of a record from the Internet linked database. The IDLCM enables any search engine to create a suitable reference link to the desired database record, enabling the automatic display of this link reference within the search engine's result list. The reference link itself, on the search engine's results list, emanates from the search engine having scanned and indexed the automatically generated database engine stored by the IDLCM on a Universal Resource Locator (URL) and set of Web pages specific to the target database and record. As an example using this methodology, a database of local content information can be provided to all Internet search engines automatically, with the end-user being linked to a relevant site where local content information and appropriate GIS tools are available.

The map frame is where the search location, range and result points are displayed and configured. The display of a Lasoo provides an intuitive range ring on the map. The Lasoo defines the spatial proximity component of a search and is a circle placed on a map with a center, (x, y), and a radius, r. The system displays multiple results on the map as a set of independent 'dots', including a feature that accumulates overlapping results into one 'dot' but enables a user to select from a pop-up window displaying records belonging to the 'dot' when the user clicks on the 'dot'.

In addition, this interface area provides important navigational and search criteria controls such as zooming controls, a location finder or

"gazetteer", range or Lasoo' size control, a viewfinder for fine-tuning current location, 'center Lasoo' control, 'place Lasoo' control, and map panning control. Searches are conducted using detailed, high quality, worldwide maps featuring zoom levels down to street-level and a worldwide gazetteer offering city and place names worldwide. The invention automatically links a geo-coded information database with associated Internet Web pages, and provides integrated search and retrieval of information from database and Web simultaneously.

In an embodiment of the present invention, search queries can be initiated either through a direct keyword input or by clicking on any category item. A search query can be conducted either through user keyword input or by selecting from a customized, 'clickable' category tree. Only populated categories appear. Searching can be performed within an information directory and/or a web site.

An Auto Range Determination Module (ARDM) that automatically detects the minimum range (geo-spatial distance) that needs to be set in order to locate and retrieve a minimum, specified number of search results, for a particular set or classification of records stored within a geo-located database, where each record has latitude and longitude attributes. The ARDM is input with the location in latitude and longitude setting, where the search is to commence.

Options within the DCM permit non-populated categories to be omitted from the category search tree or to be presented as 'grayed out', with the further option that unselected categories, if chosen will use the ARDM function to retrieve record(s) for this category by automatically extending the search range appropriately.

In an embodiment of the present invention, the Search Interface further includes an Extended Range Record Module (ERRM) that provides geo-spatial indexing of records beyond a standard containment area and allows for the search and retrieval of such a record for a geo-spatial search commencing at a point and for a range beyond the standard search area availability of the record.

Typically, a search is based on a location and search range or distance. This procedure defines a local content search for information such as businesses and organizations located within the defined search zone. The extended range attributes for any single record can be set and the ERRM will ensure that the record will appear within appropriate geo-spatial searches using any location and range, from 1 meter to worldwide.

However, there are important instances where information and/or records should be 'searchable' for search locations and ranges that do not contain the physical location the information record is tied to. For instance, a Florist A may want to market flowers to anyone searching/residing within a 50 km radius of his store location. If someone was 35 km distance and searching for Florist shops within a 10 km radius, then such a search would not contain Florist A. If one searched within 5 km for a local pet shop and none was found, the invention automatically extends the search further for you until one or more records are found, or a pre-defined threshold has been reached.

In an embodiment of the present invention, a Dynamic Filter (DF) automatically senses a user's profile depending on the user's preferences, the user-specified category filter class, and the category structure returned by the DCM. The category filter class is one of several pre-established sub-sets of the master category structure designed by the system architect to reflect the category interests of specific groups. The DF ensures that all of the user's settings and preferences are applied to the DCM to produce a dynamic, fully

customized set of categories for searching based on the current user's map setting.

The parameters of the DSRM can be dynamically altered at the moment the module is invoked, to match the user's preferences in terms of categories of most interest. DSRM parameters can be adjusted to specify range limits and minimum returned result set. In addition, the user may create as many "favorite folders" within which can be recorded details of the current search the user has performed, including retention of specific record result details, all of which can be used to automatically search and retrieve relevant data in future search sessions.

"Cookie" technology can be employed to provide a powerful, more personalized experience by storing information about an individual user's preferences and previous choices. For example, a cookie could hold keyword or category searching criteria and/or user search location information, enabling a business to customize and target delivery of information and advertisements. The invention enables the easy customization of mapping icons and/or the prioritization of results to reflect specific business promotions and sponsor needs.

In an embodiment of the present invention, the search interface includes a circle for indicating the area to provide information about. In an embodiment of the present invention, multi-colored circles are provided with equidistant placed concentric rings to form a 'bulls eye' style target, or "Lasoo". Each colored ring forms a concise geographic selection area that increases in physical area as the radius increases. Results found in a particular query appear as dots within these rings.

Map Interface:

A semi-transparent target (STT) is imbedded within each map to provide a visual reference for the user that graphically outlines the search area the user has selected and provides a visual reference for multiple result points that are automatically positioned on the map, so that the user can easily determine visually their relative distance from the center of the search location as well as their distance from each other. The semi-transparent aspect of the STT enables all of the underlying and overlying map details to be readily distinguished. The STT records current geo-position for the device or that selected by the user, along with the currently selected or determined search range, dynamically feeding this data to other software objects.

An STT Automatic and Dynamic Positioning Module (STTAPM) is included to enable a user to click anywhere on the map display to automatically reposition the STT to a point indicated by a mouse pointer. The STTAPM also automatically repositions the STT whenever the user selects a new location from within the gazetteer, or selects a previously used location.

The resulting symbol, typically a dot on the map is evaluated using a Boundary-Subset Module (BSM) to determine if one or more result points will overlap, causing visual confusion and deterioration of data communication to users. If such a case arises, an incorporated optimizer will select points to combine in order to eliminate overlaps, and size the resulting point to a larger dimension to visually reflect that it represents more than one point.

A detailed page 'pop-up' is provided for any result whenever a user clicks on the applicable record in the results list or on the corresponding 'dot' on the map, without altering the underlying map/results list display. The page pop-up includes a street-level location map showing the precise location of the record, address and contact information; links to the corresponding Web

page where applicable, and other text and information, which a record owner may add.

The BSM's parameters are fully adjustable to suit design parameters pertaining to spacing requirements and aesthetics. Since the entire module set is re-computed as a map is drawn, panning, zooming, and/or relocation of map data results in a dynamic re-assessment of the position and size of a map result points.

As illustrated in Figure 4, in an embodiment of the present invention, a Micro Mapping Module (MMM) links CAD files or scanned images with geo-spatial positioning controls and map link controls, to provide an integrated view of the interior of buildings and/or high-definition mapping for precise areas such as shopping centers, exhibit centers, fair grounds, manufacturing plants, and park grounds. The MMM enable the precise location of any object or position on the micro map to be determined and displayed to the user. The MMM link control enables a micro map to be integrated within a standard digital street level display, so that a user has a seamless means of 'drilling down' from the digital street map to within the micro map.

In addition, micro map zoom/pan controls enable zooming and panning within the micro map in a completely analogous manner to the zoom/pan controls for the standard digital maps. All map controls such as zoom, pan, range, and location utilize a unique rollout feature called Rollout Map Controls (RMC). When a user clicks on the applicable control, an expanded control feature list window appears to the side of the control. The user can then select from among the expanded list of available features for that control This technique optimizes the use of limited display space and at the same time offers a full set of expanded features without the need to refresh a screen display, since the roll-out control and its embedded feature display list are downloaded and instantly available from the main page the control sits on.

A View Finder control provides a unique means of panning a map. The 'viewfinder' tool enables a user to pan the main map by moving the viewfinder over a rollout index map that features a much larger geographical area than that of the main map. The user moves the viewfinder by pointing and clicking to the new desired position of the viewfinder. At the same moment as the viewfinder moves on the underlying index map, the main map in the map pane refreshes to show the new map determined by the viewfinder control's new position. The map 'viewfinder' tool enables a user to pan the main map by moving a viewfinder control on a rollout index map that features a much larger geographical area than that of the main map.

A Custom Spatial Driving Directions Module (CSDDM) enables the owner of a database record to record customized driving directions onto a street-level, or other zoom level, map display by specifying a series of linked points on the map simply by clicking with the mouse pointer at the applicable places on the map. The series of linked points then becomes a 'route' on the map. Routes can then be rated according to type, such as quickest, scenic, or walking route.

In addition, the CSDDM enables the addition of descriptive text by a database record owner in an adjacent text box; explaining the route and adding other useful end-user information. The CSDDM enables the addition of any number of custom 'driving direction' routes to a map, and to store these custom routes with the applicable database record(s). Further, the CSDDM provides an end-user interface for selecting from a list of routes, as illustrated in Figure?

In an embodiment of the present invention, a Geo-enabled Messaging and Conference Module (GMCM) is included that automatically applies spatial characteristics to each member of a conference or messaging service and

enables members to selectively communicate with other members within the STT the user has defined. In this manner, members may view the locations of all members, or any desired geographical sub-set of members, on the map display and select on a geo-spatial basis which communications to process.

Results Table Interface:

The Results Table Interface (RTI) displays the search results in a table format. Each result found in the table is linked to a specific record point (dot) on the map. A user may inspect results by either rolling over a record within the Results Table or by rolling over a record point on the Map. Either procedure will yield a colored 'hot-link' between the mapped result and the table result for a specific record. Displays search results in a list and multi-point map format simultaneously.

Any selected result record occurring in a search area on the map, or 'Lasoo', appears in a Results Table below the map. The results table is color-coded depending on the color Lasoo ring in which a resulting dot is found. Results are displayed normally from nearest to farthest from a Lasoo center. The Results Table further features symbology associated with additional information for each record in the table, a distance field, a listing of the radial distance from Lasoo center, extended range records, directory/search category labels, 'Next' and 'Back' table review controls, hot-linked row click launch, a hot-linked 'roll-over' map highlighter.

A Dynamic Search Results Updating Module (DSRUM) is included for creating automatically updated search results based on the current position of the STT as the user moves or re-sizes the STT controls within the map pane. Whenever a user places the STT in a new position or re-sizes the range of the STT, the DSRUM performs an automatic background update of the search results, and automatically refreshes the search results list.

In an embodiment of the present invention, a user can sort the list according to several alternative criteria. Enables the user to sort the search results by several criteria, such as distance, category, and name.

In an embodiment of the present invention, a Linked, Rollover Map/List Search Result Highlighting function provides a feature that when a user rolls over a result dot on a map, or a result row on the Results List, the result dot and row is highlighted. A Roll-out Thumbnail Map & Information (RTMI) function automatically produces a 'thumb-nail' map and other text information related to a result row, and displays this information to one side of the result row whenever the user 'rolls-over' the row with the mouse pointer. This function operates in real-time and is independent of the number of result rows in the results table. The thumbnail map shows the precise street-level map view associated with the address in the applicable result row.

A rollover function enables a user to identify visually the location of any result by 'rolling over' either the result on the result list or by placing the pointer over a result 'dot' on the map. The item being rolled-over automatically highlights by changing color, on the map and the results list simultaneously. A rollover, information expansion function automatically displays additional information for a result whenever the user rollovers the corresponding 'dot' on the map or the row in the results lists. Additional information displayed to the side of the results lists may include a thumbnail street-level locator map, and/or Web link information.

As illustrated in Figure 5, in an embodiment of the present invention, the system/invention can also be used in a wireless environment. The GUI implementations will vary depending on wireless device specifications and bandwidth. Maps are incorporated on devices with higher resolution displays. A keyword search and location can be inputted or both can be determined

automatically by links to the wired and use of wireless location technology. Using a Street Intersection Locator, specifying a street intersection can identify a Lasoo or using auto-location technology that enables usability for resource limited wireless devices. In an embodiment of the present invention, a wireless application can use a Smart Street ID to return a short list of eligible street intersections for a user to select the desired item. Results are displayed in a scrollable list, sorted by distance from the center of the Lasoo.

In an embodiment of the present invention, the invention delivers locally targeted advertising and information according to any specific location and/or demographic profile employing geo-location ad serving. In an embodiment of the present invention, the invention can automatically store and retrieve user preference information, such as selected location and search criteria, and enables users to modify preference data, dynamically filters categories not present in mapping area, and dynamically modifies category information presentation based on user selectable filters. The invention dynamically extends the searchable range of any individual record in a geo-coded database, enabling users to automatically locate records outside their specified search range that nevertheless have a logical local presence within a specified search range.

In an embodiment of the present invention, the invention enables database record owners to create date/time sensitive billboard "notes" that are automatically displayed in local content search results. Automatically provides a geo-coded, searchable, web-page presence for all businesses and organizations in all major countries and markets worldwide. Enables record owners to enhance the display characteristics and content of their record(s) within a geo-coded database.

In an embodiment of the present invention, the invention provides seamless integration of wired and wireless capabilities, including automatic

delivery and configuration of information to wireless devices, along with automatic detection of wireless device type. Integrates seamlessly with automatic location determination capabilities of a wireless device, to automatically deliver location specific results and information to end-users. Automatically generates demographic profiling data by any user-defined region worldwide, greatly enhancing direct marketing capabilities while at the same time adhering to enhanced levels of privacy control.

In an embodiment of the present invention, the invention provides map navigation rollout controls that provide reduced display area footprints. Provides user controlled map functions enabling users to enhance and update map information for private or public use. The invention provides map functions and filters that enable users to select map display type, such as topological, vegetation, or interest-oriented.

Users can define desired search location by simply clicking on a map or choosing from drop-down list controls without requiring any typing. The invention searches and finds information records and their associated Web sites using a single, simple search interface. Searches are performed by advanced keyword combinations and provide an ability to perform "multi-tier" searches, wherein searches within searches are performed automatically.

In wireless embodiments of the present invention, the system further includes a Dynamic Location Sensitive Auto Search Module (DLSASM) for automatically re-configuring the position of a user's STT on a wireless device as the user's position changes while the wireless unit is being transported. The automatically repositioned STT includes a refreshed set of characteristics and attributes derived from other features and modules.

In wireless embodiments of the present invention, a Wireless Automatically Configured Search Module (WACSM) enables a user to

configure a local search engine to conform from a user's wired desktop browser to the characteristics of a wireless device. Further, the WACSM automatically downloads this configuration information, along with the user's search preferences to the wireless device whenever the user activates the wireless unit.

In an embodiment of the present invention, in order to facilitate local searching, a Spatial Information Favorites Module (SIFM) permits users to record their favorite search locations, by having the system memorize a currently selected location on the map or from the gazetteer.

Adding new information to the Internet has been a bureaucratic and often intimidating process for most Internet Users and is normally associated with a fee. The invention enables users, including private individuals, businesses and organizations, to add new content to the Internet by simply clicking on a map and posting their own information. Coupled with this is an ability to have a calendar and/or bulletin board feature associated with an entry.

The invention includes an integrated wired and wireless geo-spatial search solution, including a capability to automatically 'load' a wireless device with data, set-up and user preference information defined and obtained from the wired side. This enables a user to employ both wired and wireless Internet-capable devices to conduct geo-spatial searches. The invention enables the delivery of information targeted to specific locations and demographic profiles, using the invention's client positioning capabilities, regardless of how or where the client accesses the Internet.

Figure 6 Illustrates a simplified overview of the logical architecture for the system. The "Geocoding Service" is responsible for converting a conceptual location specification, such as street address, into a precise

longitude/latitude value, which in turn can be used to form a mapping/search request that is centered on that value. The "Mapping Service" provides the list of points that are plotted over the background map based on their proximity to a point of interest and other attribute criteria, such as datum category or similarity to a search string. The "Lasoo Template Engine" and the appropriate template are responsible for delivering an interactive interface, including the plotting of points over the map image backdrop. Figure 7 illustrates an overview of the system.

The invention provides detailed mapping and local content capability worldwide, including the unique ability to specify a dynamic adjustable search range for each individual geo-located record. The invention's dynamic category/content filtering capabilities enable the presentation to an end-user of solely the sub-set of categories and content relevant to the user's specified search criteria and search location.

The invention enables search engines the world over to be automatically geo-location/local content enabled by virtue of the capabilities of the IDLCM. The invention provides for user insertion and modification of geo-coded content within a worldwide Internet searchable database, and enables users to specify a precise search location without requiring address information. The invention enables users to create and deploy advertising and information banners/announcements to targeted, local audiences, anywhere in the world. In experimentation, the system was able to searches and find in excess of 10,000 records spatially in less than 0.5 seconds, providing a very fast result.

The invention removes the barriers to finding local content quickly and easily. The invention solves the problem of requiring specific postal code or other positional information in order to conduct a search for local content by providing simple 'point and click' entry to begin a search anywhere in the

World. The invention provides scalability and reliability, delivering comprehensive, targeted and customizable geo-coded local content, based on a user's actual or preferred location anywhere in the World, to any wired or wireless Internet device.

Although the present invention has been described in considerable detail with reference to certain preferred embodiments thereof, other versions are possible. Therefore, the spirit and scope of the appended claims should not be limited to the description of the preferred embodiments contained herein.

What is claimed is:

1. An information retrieval system employing spatially selective features, the system comprising:
   a search interface;
   a map interface;
   a results table interface; and
   a Lasoo tool for selecting a search area.

2. The system according to claim 1, wherein the search interface further includes:
   a Polygon Search Module (PSM) having an Automatic Clipping Engine (ACE);
   a Dynamic Search Range Module (DSRM);
   a Dynamic Categories Module (DCM); and
   an Internet Database Link Control Module (IDLCM).

3. The system according to claim 1, wherein the map interface further includes:
   a Semi-Transparent Target (STT);
   an STT Automatic and Dynamic Positioning Module (STTAPM); and
   a Boundary-Subset Module (BSM).

4. The system according to claim 1, wherein the results table interface further includes a Dynamic Search Results Updating Module (DSRUM).

5. The system according to claim 1, further comprising rollout map controls are provided to optimize the use of limited display space.

6. The system according to claim 1, further comprising multilingual capability.

7. The system according to claim 1, further comprising the employing of "cookie" technology to provide a powerful, more personalized experience.

8. The system according to claim 1, further comprising customization of mapping icons and/or prioritization of results to reflect specific business promotions and/or sponsor needs.

9. The system according to claim 1, further comprising the customization of a mapping icon, such as providing the icon as a corporate trademark or color scheme.

10. The system according to claim 1, further comprising a geo-enabled messaging and conference module to apply spatial characteristics to each member of a conference or messaging service and to enable the members to selectively communicate with other members.

11. The system according to claim 1, further comprising the customized prioritization of results, to reflect a specific desired business need, such as "top-of-list" promotions, spatial alerts, or pay-per-ad restrictions.

12. An information retrieval method employing spatially selective features, the method comprising the steps of:

(i) providing a search interface;
(ii) providing a map interface;
(iii) providing a results table interface; and
(iv) providing a Lasoo tool for selecting a search area.

13. An information retrieval method employing spatially selective features, the method comprising the steps of:

(i) defining a search area;

(ii) detecting a minimum search area needed to locate and retrieve a minimum, specified number of search results;

(iii) indexing records beyond the defined search area and search and retrieve records search commencing at a point and for a search area beyond the defined search area availability of the record;

(iv) creating a dynamic set of categories to present to the user dependent on the current map setting; and

(v) evaluating all records and determining an appropriate default search area to ensure the provision of search results in all appropriate categories.

14. An information retrieval system employing spatially selective features comprising a map interface for displaying results from a search comprising:

a semi-transparent map target to provide a visual reference for the user;

means to re-position the semi-transparent map to the point indicated by the mouse pointer;

optimizing means to optimize the map;

micro-mapping means to provide an integrated view of maps at various zoom levels;

roll-out map controls to optimize the use of limited display space;

view finder control to provide a panning function to the map; and

custom spatial driving directions to display a list of routes on the map.

15. An information retrieval system employing spatially selective features comprising:

means for defining a search area;

means for detecting a minimum search area needed to locate and retrieve a minimum, specified number of search results;

means for indexing records beyond the defined search area and search and retrieve records search commencing at a point and for a search area beyond the defined search area availability of the record;

means for creating a dynamic set of categories to present to the user dependent on the current map setting; and

means for evaluating all records and determining an appropriate default search area to ensure the provision of search results in all appropriate categories.

16. A storage medium readable by a computer, the medium encoding a computer process to provide an information retrieval method employing spatially selective features, the computer process comprising:

a processing portion for defining a search area;

a processing portion for detecting a minimum search area needed to locate and retrieve a minimum, specified number of search results;

a processing portion for indexing records beyond the defined search area and search and retrieve records search commencing at a point and for a search area beyond the defined search area availability of the record;

a processing portion for creating a dynamic set of categories to present to the user dependent on the current map setting; and

a processing portion for evaluating all records and determining an appropriate default search area to ensure the provision of search results in all appropriate categories.

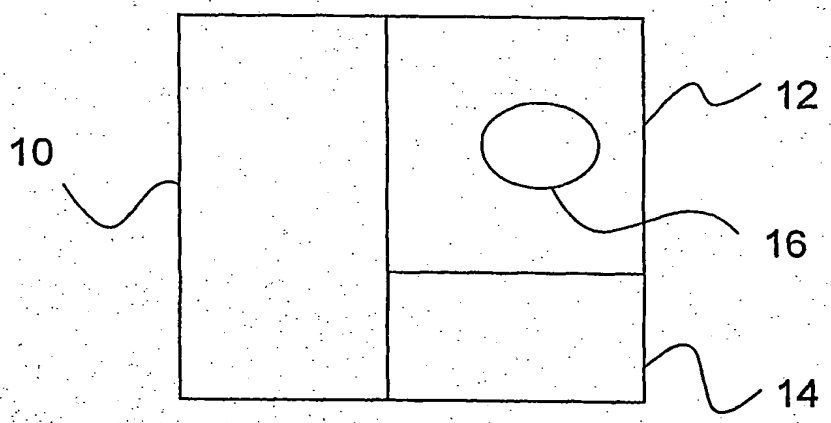


Figure 1

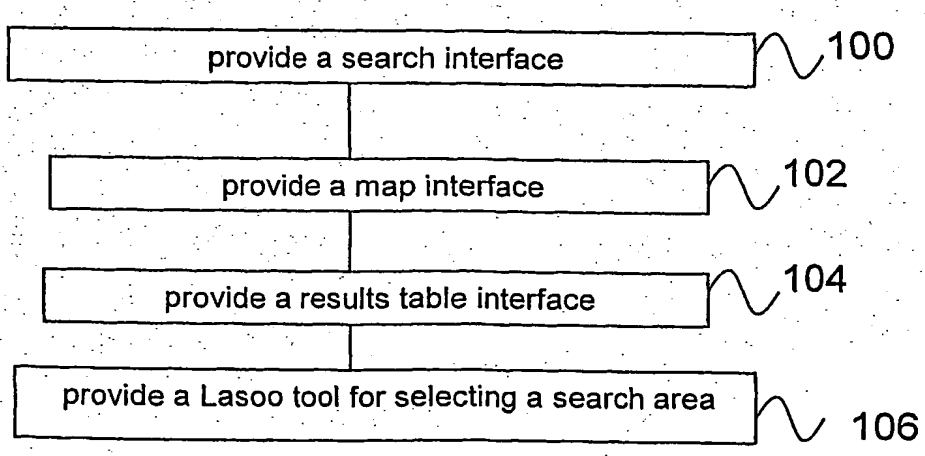


Figure 2

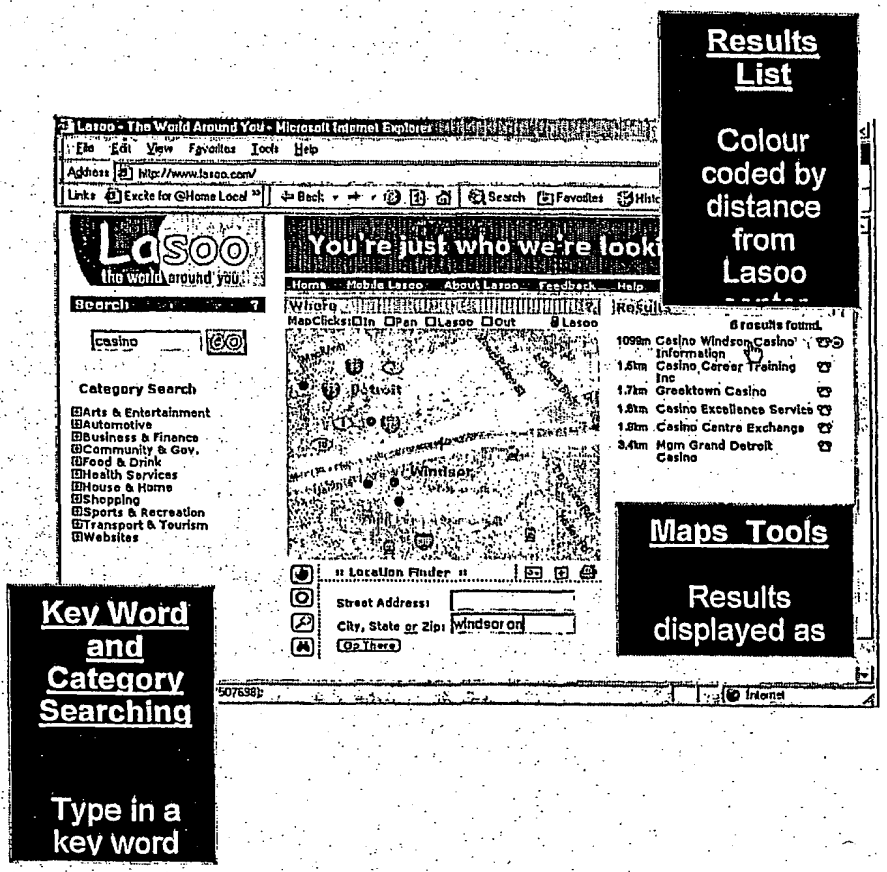

Results List
Colour coded by distance from Lasoo
Lasoo - The World Around You - Microsoft Internet Explorer
Lasoo
You're just who we're looki
Search
casino
Category Search
Arts & Entertainment
Automotive
Business & Finance
Community & Gov.
Food & Drink
Health Services
House & Home
Shopping
Sports & Recreation
Transport & Tourism
Websites
Detroit
Windsor
Location Finder
Street Address:
City, State or Zip: Windsor on
Go There
6 results found.
1.5km Casino Career Training Inc
1.7km Greektown Casino
1.8km Casino Excellence Service
1.8km Casino Centre Exchange
3.4km Mgm Grand Detroit Casino
Maps Tools
Results displayed as
Key Word and Category Searching
Type in a key word

Figure 3

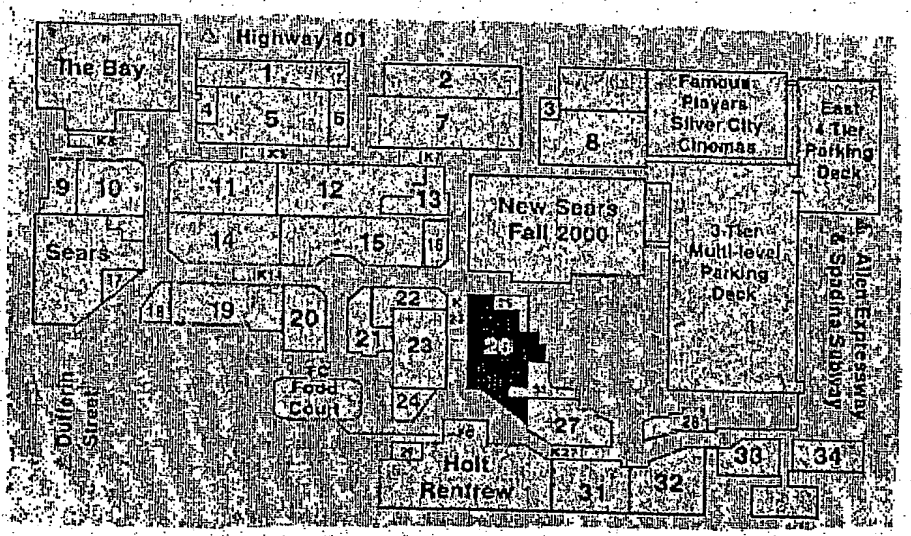

Highway 401
The Bay
Famous Players Silver City Cinemas
East 4 Tier Parking Deck
New Sears Fall 2000
Sears
3-Tier Multi-level Parking Deck
Allen Expressway & Spadina Subway
Dufferin Street
Food Court
Holt Renfrew
1
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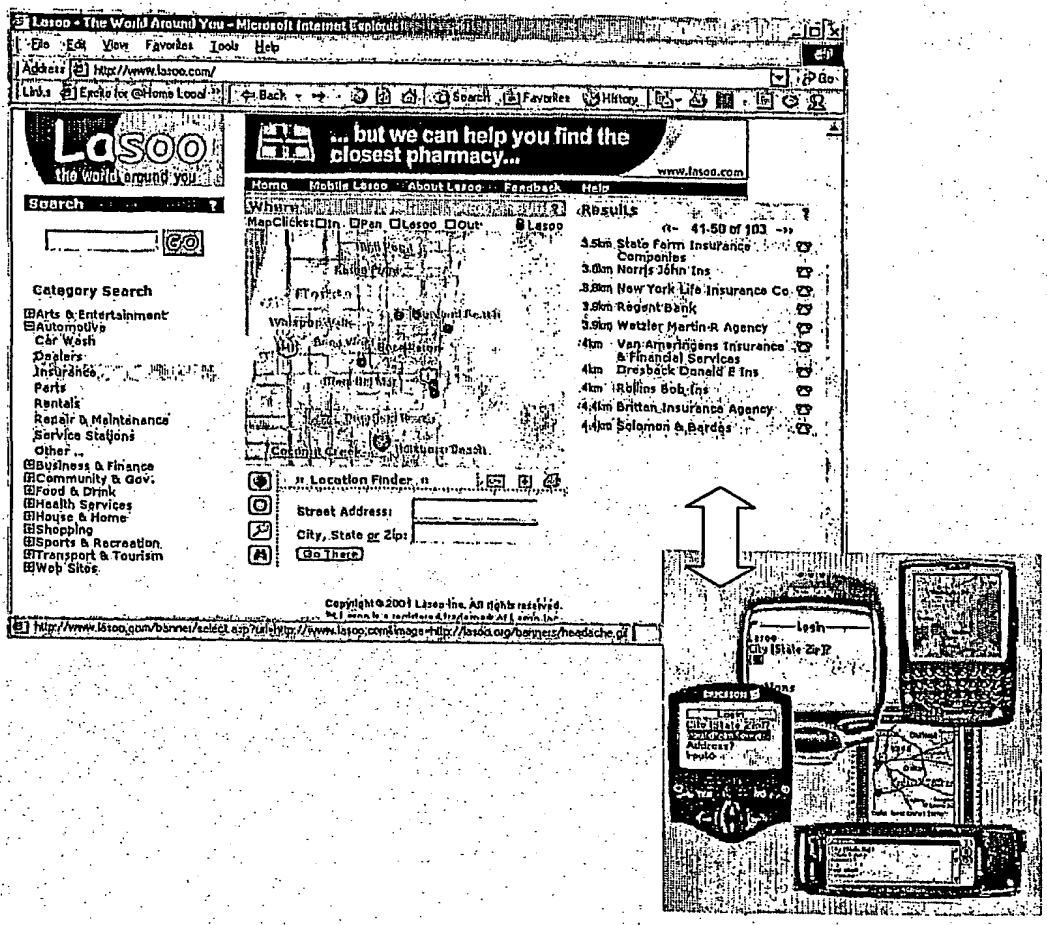
Figure 4


Lasoo - The World Around You - Microsoft Internet Explorer
Lasoo
the world around you
... but we can help you find the closest pharmacy...
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Mobile Lasoo
About Lasoo
Feedback
Help
Search
Category Search
Arts & Entertainment
Automotive
Car Wash
Dealers
Insurance
Parts
Rentals
Repair & Maintenance
Service Stations
Other...
Business & Finance
Community & Gov.
Food & Drink
Health Services
House & Home
Shopping
Sports & Recreation
Transport & Tourism
Web Sites
Results
3.5km State Farm Insurance Companies
3.8km Norris John Ins
3.8km New York Life Insurance Co
3.9km Regent Bank
3.9km Wetzler Martin R Agency
4km Van Ameringens Insurance & Financial Services
4km Dreyback Donald E Ins
4km Rollins Bob Ins
4.4km Brittan Insurance Agency
4.4km Solomon & Berdes
Location Finder
Street Address:
City, State or Zip:
Go There
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Figure 5

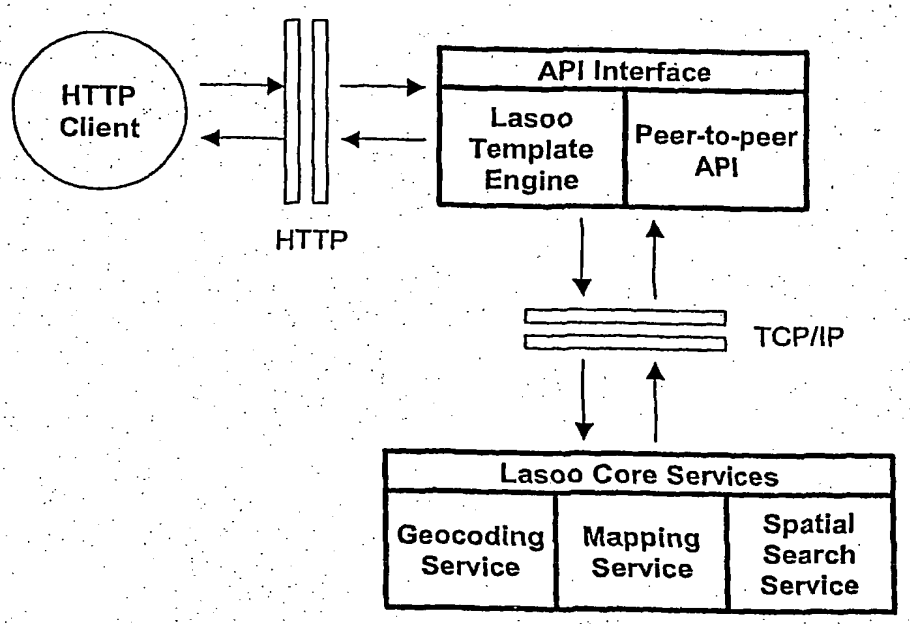

Figure 6

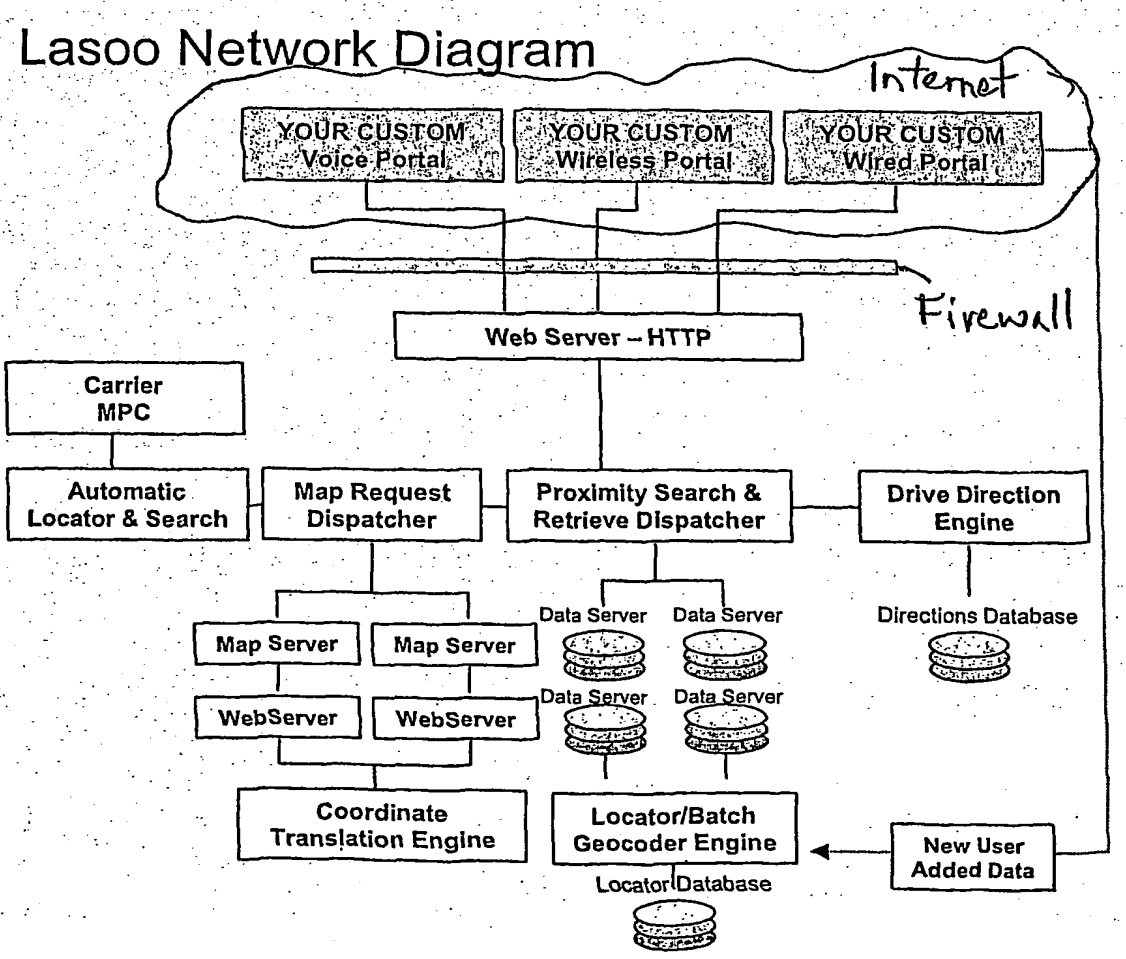

Figure 7